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		DB=USPT; PLUR=YES; OP=ADJ	
☐	L19	size and memory and L18	5
☐	L18	check$ and size and L15	6
☐	L17	L16	0
☐	L16	(over size or over limit or over-size) and L15	0
☐	L15	(transmit$4 same header) and l11	6
☐	L14	(header adj3 only) and L10	1
☐	L13	(header adj only) and L10	0
☐	L12	header adj only and L10	0
☐	L11	check$4 and L10	16
☐	L10	l4 and L9	17
☐	L9	header$ and L8	17
☐	L8	size$ and L6	56
☐	L7	l3 and L6	0
☐	L6	l2 and L4	104
☐	L5	l2 and L4	104
☐	L4	warn$4 same L1	243
☐	L3	(size$ or load$4) adj4 (check$4 or detect$4)	34796
☐	L2	client and server	20159
☐	L1	email or e-mail or electronic mail	14398

END OF SEARCH HISTORY

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L19: Entry 2 of 5 File: USPT Jun 17, 2003

DOCUMENT-IDENTIFIER: US 6581092 B1
TITLE: Method and system for remote diagnostic, control and information collection based on various communication modes for sending messages to users

Brief Summary Text (3):
This invention generally relates to the use of network messages for communicating information to an end user regarding the usage of a network resource. The invention is more particularly related to the processing performed within a computer in order to process and forward the appropriate information from the network resource to the end user. The invention is further related to a method and system for sending an electronic mail message to an end user regarding the end user's usage of the network resource. Still further, the invention is related to the transmission of a warning message to an end user, for example, when a number of pages printed by the end user on a network printer is close to a predetermined limit.

Detailed Description Text (2):
Referring now to the drawings, wherein like numerals designate identical or corresponding parts throughout the several views, and more particularly to FIG. 1 thereof, there is illustrated a figure showing various machines and computers for monitoring, diagnosing and controlling the operation of the machines. In FIG. 1, there is a first network 16, such as a Local Area Network ("LAN") connected to computer workstations 17, 18, 20 and 22. The workstations can be any type of computers including IBM Personal Computer compatible devices, Unix based computers, or Apple Macintoshes. Also connected to the network 16 are a digital copier/printer 24, a facsimile machine 28, and a printer 32. The devices 24, 28 and 32 are referred to as machines or monitored devices and other types of devices may be used as the machines or monitored devices, including any of the devices discussed below. Also, a facsimile server (not illustrated) may be connected to the network 16 and have a telephone, ISDN (Integrated Services Digital Network), wireless, or cable connection. In addition to the digital copier/printer 24, facsimile machine 28, and printer 32 being connected to the network 16, these devices may also include conventional telephone and/or ISDN and/or cable connections 26, 30 and 34, respectively. As is explained below, the business office machines or business devices 24, 28 and 32 communicate with a remote monitoring, diagnosis and control station, also referred to as a monitoring device, through the Internet via the network 16 or by a direct telephone, ISDN, wireless or cable connection.

Detailed Description Text (6):
Information of the business office machines 24, 28 and 32 may be stored in one or more of the data bases stored in the disks 46, 54, 58, 64, 70 and 76. Each of the customer service, marketing, manufacturing, and engineering departments may have their own data base or may share from one or more data bases. Each of the disks used to store data bases is a non-volatile memory such as a hard disk or optical disk. Alternatively, the data bases may be stored in any storage device including solid state and/or semiconductor memory devices. As an example, disk 64 contains the marketing data base, disk 58 contains the manufacturing data base, disk 70 contains the engineering data base and disk 76 contains the customer service data base. Alternatively, the disks 54 and 46 store one or more of the data bases.

Detailed Description Text (10):

h e b b g e e e f c e hb g e ge

FIG. 3 illustrates a block diagram of the electronic components illustrated in FIG. 2. The CPU 160 is a microprocessor and acts as the system controller. There is a random access memory 162 to store dynamically changing information including operating parameters of the digital copier. A read only memory 164 stores the program code used to run the digital copier and also information describing the copier (static-state data) such as the model number, serial number of the copier, and default parameters.

Detailed Description Text (12):
A storage interface 176 connects storage devices to the system bus 186. The storage devices include a flash memory 178 which can be substituted by a conventional EEPROM and a disk 182. The disk 182 includes a hard disk, optical disk, and/or a floppy disk drive. There is a connection 180 connected to the storage interface 176 which allows for additional memory devices to be connected to the digital copier. The flash memory 178 is used to store semi-static state data which describes parameters of the digital copier which infrequently change over the life of the copier. Such parameters include the options and configuration of the digital copier. An option interface 184 allows additional hardware such as an external interface to be connected to the digital copier. A clock/timer 187 is utilized to keep track of both the time and date and also to measure elapsed time.

Detailed Description Text (16):
The CPU or other microprocessor or circuitry executes a monitoring process to monitor the state of each of the sensors of the digital copier, and a sequencing process is used to execute the instructions of the code used to control and operate the digital copier. Additionally, there is a central system control process executed to control the overall operation of the digital copier and a communication process used to assure reliable communication to external devices connected to the digital copier. The system control process monitors and controls data storage in a static state memory such as the ROM 164 of FIG. 3, a semi-static memory such as the flash memory 178 or disk 182, or the dynamic state data which is stored in a volatile or non-volatile memory such as the RAM 162 or the flash memory 178 or disk 182. Additionally, the static state data may be stored in a device other than the ROM 164 such as a non-volatile memory including either of the flash memory 178 or disk 182.

Detailed Description Text (17):
The above details have been described with respect to a digital copier but the present invention is equally applicable to other business office machines or devices such as an analog copier, a facsimile machine, a scanner, a printer, a facsimile server, or other business office machines, or an appliance with which a user interfaces such as, for example, a microwave oven, VCR, digital camera, cellular phone, palm top computer, etc. Additionally, the present invention includes other types of machines which operate using a connection-mode or connectionless-mode of communication, and also e-mail, such as a metering system including a gas, water, or electricity metering system, household appliances, vending machines, or any other device which performs mechanical operations, such as automobiles, and has a need to be monitored, and performs a function. In addition to monitoring special purpose machines, and computers, the invention can be used to monitor, control, and diagnose a general purpose computer which would be the monitored and/or controlled device, and information regarding resource usage by an end user may be communicated to a resource manager, a service center and to the end user.

Detailed Description Text (32):
The various computers utilized by the present invention including the computers 266 and 276 of FIG. 5 may be implemented as illustrated in FIG. 8. Further, any other computer utilized by this invention may be implemented in a similar manner to the computer illustrated in FIG. 8, if desired, including the service machine 254, computer 272, and computer 282 of FIG. 5. However, not every element illustrated in

FIG. 8 is required in each of these computers. In FIG. 8, the computer 360 includes a CPU 362 which may be implemented as any type of processor including commercially available microprocessors from companies such as Intel, Motorola, Hitachi and NEC, for example. There is a working memory such as a RAM 364, and a wireless interface 366 which communicates with a wireless device 368. The communication between the interface 366 and device 368 may use any wireless medium such as radio waves, or light waves, for example. The radio waves may be implemented using a spread spectrum technique such as Code Division Multiple Access (CDMA) communication or using a frequency hopping technique such as that disclosed in the Bluetooth specification.

Detailed Description Text (33):
There is a ROM 370, and a flash memory 371, although any other type of nonvolatile memory may be utilized in addition to or in place of the flash memory 371 such as an EPROM, or an EEPROM, for example. An input controller 372 has connected thereto a keyboard 374 and a mouse 376. There is a serial interface 378 connected to a serial device 380. Additionally, a parallel interface 382 is connected to a parallel device 384, a universal serial bus interface 386 is connected to a universal serial bus device 388, and also there is an IEEE 1394 device, commonly referred to as a fire wire device, connected to an IEEE 1394 interface 398. The various elements of the computer 360 are connected by a system bus 390. A disk controller 396 is connected to a floppy disk drive 394 and a hard disk drive 392. A communication controller 406 allows the computer 360 to communicate with other computers, or send e-mail messages, for example over a telephone line 402, or a network 404. An I/O (Input/Output) controller 408 is connected to a printer 410 and a hard disk 412, for example using a SCSI (Small Computer System Interface) bus. There is also a display controller 416 connected to a CRT (Cathode Ray Tube) 414, although any other type of display may be used including a liquid crystal display, a light emitting diode display, a plasma display, etc.

Detailed Description Text (34):
FIG. 9 illustrates various objects such as software objects and modules contained within the computer 360. The computer 360 is connected to a mail server 430 through which mail is sent and received. The mail server 430 may be located at the Internet service provider 264 of FIG. 5, may be located on a network, may be owned by the company owning the computer 360, or may even be located inside of the computer 360, for example. An e-mail processor 432 is utilized to control the transmitting and receiving of electronic mail messages. The e-mail processor may be implemented in any desired or known manner and may be based on commercially available electronic mail programs such as Microsoft's Outlook Express, or GroupWise by Novell, although any other e-mail program may be used, if desired. As a specific implementation, the e-mail system may retrieve e-mail from the server using POP3 (Post Office Protocol) and to access the e-mail server in order to send e-mails using SMTP (Simple Mail Transfer Protocol), although any other protocol may be used, if desired. If the computer 360 utilizes an operating system such as an operating system from Unix, then the computer will usually have an IP address and a mail system built-in. Therefore, there may be no need to utilize the mail server 430 with such a system. A registry 434 contains various information of the system and may be implemented in the same or similar manner as the registry of Windows 95, Windows 98, and/or Windows NT, for example. Incoming mail information 436 may be utilized to store incoming mail. Additionally, if desired the incoming mail information 436 may be implemented to store the POP3 location, and store file information about the incoming e-mails. Outgoing mail information 438 contains information regarding SMTP and file information for outgoing mail. A device driver 440, such as a printer driver, scanner driver, or other driver, for example may be used to communicate with the device 442 which may be any type of device from which information is desired or to which information or control signals are to be sent. The device driver 440 is implemented to translate commands or signals from the e-mail processor 432 to signals which are transmitted to the device 442 and vice versa. Alternatively, the e-mail processor 432 may perform more of the processing

functions and the device driver 440 may have more simple programming and few responsibilities. Further, any other implementation of the software may be utilized as long as the function of proper communication and control of the device 442 using e-mail messages is performed.

Detailed Description Text (35):
A more detailed exemplary implementation of the device driver 440 of FIG. 9 is illustrated in FIG. 10. The device driver 440 includes a device function support module 454 which may be implemented to perform the conventional and/or desired functions of a device driver. The device driver 440 also includes a remote control and diagnostic module 452. If desired, the remote control and diagnostic module 452 may be implemented to perform some or all of the control and/or diagnostic functions which are described in the related patent and patent applications and are incorporated by reference above. By implementing the control and diagnostic module 452 in the device driver 440, the cost of the device 442 may be reduced and the resources and capabilities of the device 442 may be eliminated or reduced such as by reducing the amount of memory in the device 442 such as DRAM (Dynamic Random Access Memory) or flash memory, for example. This reduced cost is possible as the hardware resources of the computer 360 may be utilized in place of constructing additional hardware to go into the device 442, if desired. Various information including log information and error information may be stored in a data base which includes device data 456 using any desired hardware and data or data base management software. Further, software within the device 442 may be reduced by increasing the functions performed by the device driver 440 including functions performed by the remote control and diagnostic module 452 and the device function support module 454. These two software modules may be implemented in one software module, if desired. Additionally, the software which keeps track of the usage of the device may be removed from the device itself and included in the device driver 440.

Detailed Description Text (39):
Exemplary details of transmission of urgent and non-urgent transmission are disclosed, for example, in U.S. Pat. No. 5,819,110, and as discussed below. Means other than electronic mail may be used for the purpose of calling attention for urgent service. For routine information, however, the Service Center 502 may manage all resources on the Intranet 600 and may send predetermined selected information to the Resource Administration station 610 using electronic mail. Although the information may be available, for example, on the World Wide Web, busy end users tend to forget to check web sites. Thus, electronic mail is well suited for obtaining the attention of a proper recipient of the message.

Detailed Description Text (43):
Any type of e-mail-mode of communication may be used by the present invention. An inexpensive and readily available medium through which e-mail messages may pass is the Internet processing electronic mail messages. The e-mail input and output processes may be according to any known Internet e-mail protocol such as used by the BSD Unix mail system which is incorporated into the SunOS 4.1.X. Also, other information describing Internet e-mail operations are readily available through various sources on the Internet itself. It is well known that Internet e-mail requires an identifier or address of the machine which is to receive the e-mail. Further, Internet e-mail protocols typically construct an electronic mail message to include an envelope, a header and a body. The envelope typically includes the identifier or address of the machine or person which is to receive the e-mail and the identifier or address of the originator of the message or where replies to the message are to be sent. The header typically includes a description of the encoding type or version of the e-mail message. The identifier or address of Internet e-mail addresses typically include a name which identifies the recipient or user of an e-mail server, followed by the "@" symbol, followed by the domain name or host name of the mail server. These various features of e-mail are utilized by the BSD Unix mail system of the SunOS 4.1.X. While the Internet provides an inexpensive manner

of an e-mail-mode of communication, the Internet electronic mail system may be slow or unreliable and therefore, in certain circumstances, instead of using an e-mail process, a direct connection process as described above, is performed.

Detailed Description Text (51):
FIG. 19A illustrates an exemplary e-mail message utilized by the invention. In FIG. 19A, lines 1-7 are part of the e-mail header. Each header field contains a name, followed by a colon, followed by the field value. RFC (Request For Comments) 822 specifies the format and interpretation of the header fields, which is incorporated by reference. The fields of the header illustrated in FIG. 19A are fairly standard and self-explanatory. Line 1 indicates from where the e-mail originated, line 2 indicates the date the e-mail was sent, line 3 indicates a name associated with the e-mail address (Service Center), line 4 indicates to whom the e-mail is addressed and line 5 indicates the subject of the e-mail message. Line 6 indicates the MIME version utilized by attachment encodings. MIME is utilized to send binary files in electronic mail messages which permit only ASCII characters. MIME allows the binary encoding to be converted to these ASCII characters which are subsequently converted back to the original binary files at the appropriate time. Such a use of MIME encoding is well known. Line 7 designates one or more content fields such as the type of text, the length of the message and any other desired information.

Detailed Description Text (59):
FIG. 22 illustrates an alternative embodiment of receiving e-mail messages in which the computer or program executing therein automatically detects that the incoming e-mail message is used for communication with the attached device. Thus, in this embodiment, there may be no need for the user to execute an attached file. In FIG. 22, after starting, step 960 receives an incoming e-mail message. In step 962, a program, such as an electronic mail processing program, detects that there is an incoming e-mail message. The detection of incoming e-mail may be performed in any desired manner. Currently, commercially available e-mail programs have the capability to automatically detect incoming e-mail messages and such conventional automatic detecting capabilities may be utilized. Further, in Unix, a specific directory labeled "/var/mail" which contains a file with a user name receives files corresponding to incoming e-mail messages and when this file changes in size, appears, or more files appear, the system can detect that there is an incoming e-mail message. In step 964, the executing program parses the e-mail to determine if the e-mail is for the attached device. Such parsing is performed by determining if a predetermined code exists at a predetermined place in the e-mail message. Exemplary positions of such a code may be in the subject line of the e-mail message, may be a special code which appears within the message body, may be a code which appears in the message header, including a user defined field within the header, or may even be in the message envelope. It may also be possible for the incoming e-mail message to have an address which is routed to the computer which is attached to the device and such messages are not displayed to the user but are directly used for processing. For example, the device may have its own account. In that event, the "var/mail" directory previously discussed includes a file with the account name of the device. Step 966 performs an analysis of the parsed e-mail to determine if the e-mail is for the user or for the attached device. When the e-mail is determined to be for the attached device, flow proceeds to step 968 which performs an operation in response to the e-mail for the device. This performed operation may be any of the previously described operations including operations described in the related patents and patent applications including the performing of a mechanical action, such as movement of a scanning head or printer head or causing any other type of mechanical actions typically performed by the device in question, and also operations including the transmitting of parameters.

Detailed Description Text (61):
Another alternative to using e-mail is to send, to a user of the computer, an e-mail message with a web address where an executable file may be downloaded. Unlike attaching executable code, this method will at least allow the user to verify the

web site before downloading and executing code. This method requires more work by the user, but allows the user to check the source of the executable code.

Detailed Description Text (63):
FIG. 23 illustrates a first embodiment of transmitting an e-mail message. After starting, the message is prepared to be transmitted in step 1000. In order to prepare the message to be sent, data which is part of the message is obtained or generated. This data may be obtained by querying the device attached to the computer, or alternatively, is already stored in the computer. The data may also be obtained as disclosed in the related applications, if desired. The e-mail message is prepared to have a format of conventional e-mail systems including the envelope, header, and body of the e-mail message, as explained above, although any desired format may be used.

Detailed Description Text (64):
Step 1002 then sends the message to an outmail object. An outmail object is preferably a software object or routine executing within the computer which performs the transmission out of the computer. The manner in which the transmission is performed in the Microsoft Windows environment is through the use of the Messaging Application Programming Interface ("MAPI"). The MAPI allows interaction with the messaging system and does not require a programmer to write all code which is utilized to transmit messages. By setting the MAPI in Windows to a specific program, such as the Microsoft Outlook Express e-mail program, when a message is transmitted to the outmail object (the MAPI client), the message transmission may become automated. Details regarding the implementation and use of MAPI are set forth in the book "Inside MAPI" by Irving De la Cruz and Les Thalaer, published by the Microsoft Press, 1996, which is incorporated herein by reference. Any feature regarding the use of MAPI disclosed in this book may be utilized to implement the present invention using the MAPI client. In step 1004, the e-mail message is transmitted out of the client, preferably using the outmail object.

Detailed Description Text (72):
FIG. 29 illustrates a warning message 1150 which is generated for a particular user when the user has reached a certain percentage level of resource usage. The message is preferably sent to the end user as an e-mail message, although any type of message transmission may be used, including, for example, the intranet resource manager or a driver connected to the device may send a message to the user which appears on the user's screen as a network warning, or alert message.

Detailed Description Text (83):
In its preferred implementation, the present invention utilizes computers having separate housings than the device to which they are attached. This would allow the invention to be inexpensively implemented for installations which already have an existing computer for performing the desired processing as the new hardware costs may be reduced. Such an arrangement may also permit implementation of the invention without hardware changes to the device. However, if desired, the present invention may be implemented by including the appropriate processing and data storage capabilities in the device which is being monitored and/or controlled in addition to or as an alternative to a separate computer connected to the device. Further, this invention may be particularly applicable to existing installations such as a print server. A print server is connected to a computer network and receives requests to perform printing operations and distributes these printing operations to appropriate printing devices connected to the print server.